

# **MENMON™ 2nd Edition – Firmware/BIOS**

- **CPU/board setup: Initialize the CPU and its peripherals**
- **Load the FPGA code**
- **PCI auto configuration**
- **Perform self-test**
- **Provide debug/diagnostic features**
- **Diagnostics: POST, enhanced diagnostics for user and final production test**
- **Boot operating system (from disk, Flash or network)**



MENMON™ is a sort of BIOS for all MEN boards based on PowerPC® and other processors. It can be used to bootstrap operating systems, to test hardware, or to debug applications without running any operating system.

MENMON™ needs only a small amount of memory, nevertheless it provides a number of interesting features:

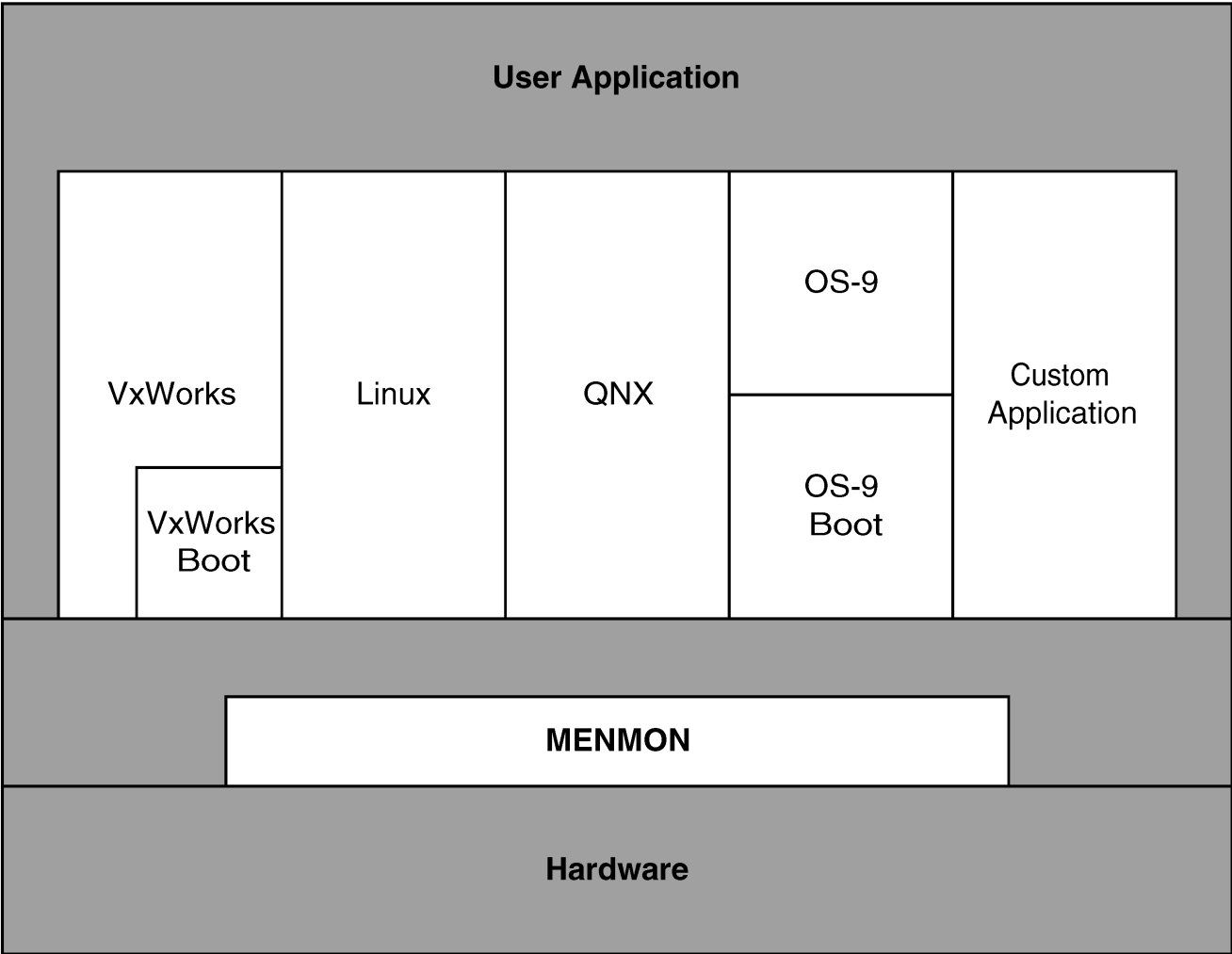
- Fallback during start-up with two MENMON™ copies in Flash (primary MENMON™ for fallback, secondary MENMON™ active -- total code size max. 1MB)
- Runs when no external RAM is available (using onchip RAM or cache)
- Network stack with Telnet and HTTP server (MENMON™ console over network, Flash update over

network, setup/control via browser)

- Graphics consoles with VGA/frame-buffer devices (optional touch/virtual keyboard) and boot logo while booting (BMP file from onboard medium, e.g. CompactFlash®)
- User-friendly PC-style setup menu (e.g. to select boot method)
- Diagnostic features (executed at power-on or on request)
- Eliminates need for a VxWorks® boot ROM
- Disk support with loading file from disk, disk update

MENMON™ is somewhat similar to a BIOS as known from x86 systems. Major differences to a BIOS structure are that MENMON™ is no longer active when the operating system has started and that it provides a limited number of system calls (PPCbug compatible).

Diagram



## Technical Data

|                                         |                                                                                                                                                                                                                      |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Architecture</b>                     | <ul style="list-style-type: none"> <li>■ PowerPC®</li> <li>■ Nios® (in preparation)</li> </ul>                                                                                                                       |
| <b>ROM Issues</b>                       | <ul style="list-style-type: none"> <li>■ Fallback MENMON™ code</li> <li>■ ROMable (operation with only a few KB of memory)</li> <li>■ Firmware binary checksum protection</li> <li>■ Code size &lt;= 512K</li> </ul> |
| <b>PCI</b>                              | <ul style="list-style-type: none"> <li>■ PCI auto configuration</li> </ul>                                                                                                                                           |
| <b>Console</b>                          | <ul style="list-style-type: none"> <li>■ Serial console</li> <li>■ VGA / frame buffer</li> <li>■ PS/2 keyboard</li> <li>■ Telnet over Ethernet</li> <li>■ HTTP over Ethernet, browser-controlled</li> </ul>          |
| <b>Bootable OSes</b>                    | <ul style="list-style-type: none"> <li>■ Linux</li> <li>■ VxWorks®</li> <li>■ QNX®</li> <li>■ OS-9®</li> <li>■ Custom images</li> </ul>                                                                              |
| <b>Boot Image Formats</b>               | <ul style="list-style-type: none"> <li>■ PPCBOOT (UBOOT)</li> <li>■ ELF</li> <li>■ RAW</li> <li>■ PReP</li> </ul>                                                                                                    |
| <b>Ethernet Boot Methods/IP Support</b> | <ul style="list-style-type: none"> <li>■ TFTP/FTP</li> <li>■ Auto-IP through BOOTP/DHCP</li> </ul>                                                                                                                   |
| <b>Disk Boot Methods</b>                | <ul style="list-style-type: none"> <li>■ PReP partitions</li> <li>■ DOS FAT 12/16/32 FS</li> <li>■ PC BIOS Partition Table support</li> <li>■ USB (not on all boards)</li> </ul>                                     |
| <b>Other Boot Methods</b>               | <ul style="list-style-type: none"> <li>■ Shared RAM (VME/CompactPCI®)</li> </ul>                                                                                                                                     |
| <b>Disk Device Support</b>              | <ul style="list-style-type: none"> <li>■ ATA/IDE disks or CompactFlash®</li> <li>■ SCSI disks</li> <li>■ PC floppy disks</li> </ul>                                                                                  |
| <b>Ethernet Device Support</b>          | <ul style="list-style-type: none"> <li>■ E100, E1000</li> <li>■ Tulip</li> <li>■ MPC5200</li> <li>■ Ethernet speed selection support</li> </ul>                                                                      |
| <b>Firmware Update Mechanism</b>        | <ul style="list-style-type: none"> <li>■ Firmware can update itself <ul style="list-style-type: none"> <li>□ Via Modem protocol (YModem)</li> <li>□ Via network</li> <li>□ From disk</li> </ul> </li> </ul>          |
| <b>Board Bring-up Features</b>          | <ul style="list-style-type: none"> <li>■ Memory inspection/modification</li> <li>■ PCI config header commands</li> <li>■ Assembler level debugger</li> <li>■ CPU register commands</li> <li>■ Memory test</li> </ul> |

## Technical Data

### Miscellaneous

- Self-test features
- Diagnostic tests
- PC-like setup menu
- VxWorks® bootline support
- System calls for bootstrappers
- Simple Boot scripts
- Parameter passing to OS
- SO-DIMM/SDRAM autodetection
- SDRAM ECC support
- Watchdog support/triggering
- I<sup>2</sup>C support
- RTC support

## Ordering Information

### Documentation

21MENM-00

MENMON™ User Manual

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